

MATING BEHAVIOR OF THE ROSECHAFER IN
NORTHERN MICHIGAN (COLEOPTERA: SCARABAEIDAE)¹

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ABSTRACT

Male and female rosechafers (*Macrodactylus subspinosus syriacus* Fab.) gather in what appear to be mating aggregations. Most individuals stay with the group less than 1 day. During copulation, males scrape pubescence from the females' pronota with their mandibles; mated females can thus be recognized. Unmounted males push against mounted males, and mounted males repel them by thrashing and pushing with their middle and hind legs.

I made a number of observations on the rosechafer, *Macrodactylus subspinosus syriacus* Fabricius, in an old field at the junction of I-75 and Riggsville road in Cheboygan County, Michigan, during July 1973. There were a large number (30) of these beetles on 4 milkweed plants within 4 yards of each other. I subsequently found them on 3 sumac (*Rhus*) bushes across the field and nowhere else in numbers, though there were individual and small clumps of sumac and milkweed elsewhere in the field.

I watched the behavior of incoming beetles at the 4 milkweed plants. As they approached in flight they usually dropped to the ground near the plants. They either crawled to the milkweed or climbed to the tops of nearby grassblades and flew to the milkweed.

Since other milkweed plants did not have large aggregations, food did not seem to be the major attractant. Virgin female *Dendroctonus* beetles are known to produce a scent which attracts both males and females (Chapman, 1969), and pheromones may have been involved in the formation of the aggregations I observed. A female observed at another locality repeatedly crawled to the tops of grasses, raised her wings slightly, and rotated her abdomen. Since the external opening of glands which produce pheromones are usually located between the posterior segments of the abdomen (Chapman, 1969), rotating the abdomen could have been a way of releasing a scent. This female did not attract any beetles during the 2 hours I observed her.

I observed copulation at the I-75 locality. When a pair came into contact, the male quickly mounted and grasped the female between her thorax and abdomen with his forelegs. Just prior to insertion of the aedeagus, males made several quick vibrations. While copulating, females remained still or walked about. Several fed upon the plant.

I noted that copulating females had shiny pronota, and that mounted males had pubescent ones. At first I considered this sexual dimorphism, but finally I observed a newly coupled pair, and the female had pronotal pubescence similar to that of males. During approximately 15 minutes following mounting and coupling, the male scraped the female's pronotum with his

¹This research was performed as a grants-in-aid project while enrolled in the Biology of Insects course at the University of Michigan Biological Station, Douglas Lake, Pellston, Michigan, during the summer of 1973.

mandibles, leaving a shiny longitudinal line. Ultimately the entire pronotum was smooth and shiny. It is thus possible to distinguish virgin females from mated ones.

Mounted males hold leg pairs 2 and 3 straight out from the body and do not move them unless they touch another beetle; in which case they thrash these legs about and drag them along the female, pushing other males away. I tried unsuccessfully to evoke this response with a twig. I experimentally increased the number of encounters between single males and mating pairs by positioning single males on grass blades alongside pairs. When a male came in contact with a pair, he pushed his head between them. This was done quickly from several angles, and then the male moved away. The mounted male thrashed with his free legs and pushed the second male. These encounters lasted 10 to 30 seconds. The longest, most vigorous encounter involved a mounted, but not yet coupled male. The single male pushed his head between the pair; the mounted male pushed him away repeatedly and quickly coupled with the female. No single male dislodged a mounted male during 22 observations.

Males sometimes encountered other males and responded (as if they were females) by quickly mounting and then crawling off. Often they mounted each other in turn before moving apart. Females rejected males by crawling rapidly or flying away. Females were often mounted a second, and even a third time, by different males. Males often mounted several females in rapid succession.

I marked an elytron of each beetle on the 2 (milkweed and sumac) aggregations with a quick drying pigment (administered with a hypodermic syringe). There was a fast turnover in these groups, with most individuals remaining 1 day or less. Of 28 individuals marked on milkweed at 10 AM, 15 July, only 12 were present (remained) at 5 PM; there were in addition 14 unmarked (newly arrived) beetles. At 5 PM the following day, 22 beetles were present; 16 unmarked, 2 from 5 PM and 4 from 10 AM the previous day. Of 48 individuals marked on sumac at 10 AM 15 July, only 17 were present (remained) at 5 PM; there were in addition 32 unmarked (newly arrived) beetles. At 5 PM the following day 16 beetles were present; 5 unmarked, 6 from 5 PM and 5 from 10 AM the previous day. No beetles moved from 1 aggregation to the other, although 1 beetle from the sumac was later found on a sumac plant 20 yards away. Other observations: 2 pairs were found coupled (again or still?) 8 hours later and 2 other pairs were found (again or still?) 32 hours later; 3 males of mated pairs were coupled with different females 8 hours later and 2 males of mated pairs were coupled with different females 32 hours later; one mated female was coupled with a different male 8 hours later and 3 mated females were coupled with different males 32 hours later.

I thank Dr. David Gates, Director of the Biological Station, for making this research possible, and Dr. James E. Lloyd, of the Biological Station and the University of Florida, for his help during the field work and the preparation of the manuscript.

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